

THE PSYCHOLOGICAL BULLETIN

PROCEEDINGS OF THE TWENTY-SECOND ANNUAL
MEETING OF THE AMERICAN PSYCHOLOGICAL
ASSOCIATION, NEW HAVEN, CONNECTICUT, DECEM-
BER 29, 30 AND 31, 1913

REPORT OF THE RETIRING SECRETARY, PROFESSOR W. V.
BINGHAM, DARTMOUTH COLLEGE

The American Psychological Association held its twenty-second annual meeting at Yale University, New Haven, on Monday, Tuesday and Wednesday, December 29, 30 and 31, 1913, in affiliation with the American Philosophical Association. About eighty members were in attendance.

Although two-fifths of the members of the Philosophical Association are enrolled as members of the Psychological Association also, the two societies had not convened at the same place for four years past, which is a sign of current trends. Indeed, before the meetings, a mild apprehension had existed in certain circles lest the temporary renewal of the old affiliation should result in crowding the psychological program with an inordinate proportion of merely theoretical contributions, at the same time interfering with the deliberations of the philosophers. Such apprehensions had small ground. Papers of a general and theoretical nature, although more numerous than at the Cleveland meeting, formed less than a third of the psychological program: fully one half of the forty-four contributions read were reports of research in the realms of normal human, animal, educational, and applied psychology; while six extremely interesting papers in physiological and abnormal psychology brought to a close on Wednesday a varied but fairly well balanced program.

The joint sessions of the two societies were among the most notable features of the convention. Monday evening the members of both associations met to hear the presidential address of Professor

McGilvary, on Time and the Experience of Time. The next evening they came together again for a banquet and a smoker at the Hotel Taft. On this occasion, Professor Warren, the president of the Psychological Association, delivered his address, on The Mental and the Physical. A joint program on Wednesday forenoon was devoted to an able and stimulating debate on The Standpoint of Psychology, the leading speakers being Professor Creighton, Professor F. M. Urban, Professor Dewey and Professor Münsterberg. Following this program, a joint business meeting was held, to hear the report of the committee appointed to ascertain the facts regarding the resignation of Professor Mecklin from the faculty of Lafayette College. The report of the committee was presented by its chairman, Professor A. O. Lovejoy, and was heard with the keenest attention. After discussion regarding the most judicious and effective action demanded by the astonishing facts disclosed in the report, it was voted, on motion of Professor Spaulding, that the report be accepted and printed at the expense of the two societies and that copies be sent to all members of these associations, to the editors of scientific journals who may care to publish the report, and to such other persons as the executive committees of the two associations in conjunction with the members of the committee may determine. [The report has been printed in full in the *Journal of Philosophy, Psychology and Scientific Methods* for January 29, and, somewhat abbreviated, in *Science* for January 30.]

Among the incidental features of the Psychological Association program, an informal round-table conference on psychological tests of college freshmen had been announced, with the thought that possibly as many as a dozen members might care to come together to exchange experiences and to confer regarding plans. About fifty persons attended the conference so that it at once assumed a formal aspect which tended to check spontaneous interchange of ideas. Professor Woodworth, who presided, described the aims which had guided the testing of freshmen at Columbia and explained that the abandonment there of the long-established practice of giving freshman tests is only temporary, pending the completion of a needed revision of the tests employed. Professor Whipple spoke a warning against the attempt to combine scientific and practical aims in the same tests, and also enumerated certain criteria of good tests. Professor Haggerty, Dean Porter, Professor McComas and the writer of this report made contributions gleaned from their limited experience in testing students at Indiana, Clark,

Princeton and Dartmouth. Dr. Wells and others added pertinent cautions and criticisms, compared the merits of individual and group measurements, and pointed out the necessity for tests of traits and abilities in realms other than the intellectual. As an outcome of this somewhat hazy and groping beginning, perhaps there will follow next year a more elaborate symposium, with papers reporting the results of current research and clearly defining the various aims and problems, possibilities and limitations, of freshman psychological tests.

Members had responded generously to the secretary's request for an exhibit of sample outlines, syllabi, examination questions, laboratory directions, and other aids to teaching. Even a cursory glance over the collection left a definite impression that teachers of psychology are applying the principles of their own science. This was evident in the tendency to make study assignments definite, and study problems numerous, specific, and vital. On the side of mere devices, one noticed the rapid spread of the use of "completion-method" ten-minute tests. Laboratory outlines showed a trend toward devoting an increasing fraction of the course to experiments in action, learning, association, and other dynamic aspects of mind.

The exhibit of new apparatus included a test object for pattern discrimination in animals, by Dr. H. M. Johnson; improved forms of puzzle-box and of instruction-box for use with human subjects, by Dr. J. W. Hayes; a test apparatus for speed and accuracy of movement, patterned after the telephone switch-board, by Professor Warren; an inexpensive portable tachistoscope, an adjustable form board, and a time clock for group experiments, by Professor Whipple; reaction and control keys, and an improved d'Arsonval chronoscope, by Dr. Dunlap; a new blood-pressure gauge, the barhemeter, by Professor G. V. N. Dearborn; a new form of dynamometer recorder, by Professor McComas; photographs of distinguished psychologists, by Professor Kirkpatrick; a psychological spectrum, by Professor Bentley; simple and double weight æsthesiometers by Rupp, exhibited by Professor Porter; and Zimmermann's new portable smoked-paper recorder without drum, adapted, after Gutzmann, for making speech tracings, exhibited by the Dartmouth laboratory. Mr. Stoelting was in attendance, with a display of standard laboratory equipment and supplies.

The ample and convenient quarters of the Yale laboratory provided an admirable place for the apparatus exhibit, for the formal

sessions, and for the informal visiting which, quite as much as the program of papers, gives value to these annual gatherings. Professor Angier, Professor Cameron and Dr. Frost, the hosts, were most generous with their personal hospitality and most efficient and foresighted in providing for the comfort and convenience of the members.

Next year the annual meeting will be held in Philadelphia with the American Association for the Advancement of Science, unless it is found that the societies with which our interests are most closely allied are to meet in affiliation with the American Society of Naturalists elsewhere. In that event, which at present seems unlikely, the Council will take up afresh the question of the place of meeting. St. Louis has been mentioned by officers of the Naturalists as a possible alternative for Philadelphia.

No final action was taken with reference to the proposal made a year ago, to hold a meeting in San Francisco in August, 1915; but the council instructed the secretary to communicate with the members before next December, to ascertain how many of them could and would attend such a meeting.

TRANSACTIONS AT THE ANNUAL BUSINESS MEETING

The officers were elected according to the plan adopted a year ago upon recommendation of the special committee on methods of electing officers. Professor J. R. Angell, chairman of the committee on nominations elected at the Cleveland meeting, presented the following report: For president, Professor R. S. Woodworth. For member of the Council to succeed Professor A. H. Pierce, Professor G. M. Whipple. For member of the Council to succeed Professor S. I. Franz, Professor S. I. Franz.

The recommendations of the committee were adopted and these officers elected.

Upon nomination of the Council, Professor Robert Morris Ogden, of the University of Tennessee, was elected Secretary-Treasurer for a period of three years.

Professor E. B. Twitmyer, of the University of Pennsylvania, was elected representative of the Association on the council of the American Association for the Advancement of Science.

Professor H. C. Warren, Professor E. L. Thorndike, and Professor J. R. Angell were elected members of the committee on nominations for the coming year.

On recommendation of the Council, the following persons were

elected to membership in the Association: E. Stanley Abbot, M.D., McLean Hospital, Waverley, Mass.; Edwina Abbott, Ph.D., Newcomb College; J. V. Breitwieser, Ph.D., Colorado College; Will Grant Chambers, A.M., University of Pittsburgh; Karl M. Dallenbach, Ph.D., University of Oregon; Lucy M. Day, Ph.D., Vassar College; J. Victor Haberman, M.D., College of Physicians and Surgeons, New York City; Louis Dunton Hartson, Ph.D., Grinnell College; David Spence Hill, Ph.D., Department of Educational Research, Public Schools, New Orleans; Walter S. Hunter, Ph.D., University of Texas; H. M. Johnson, Ph.D., National Electric Lamp Ass'n, Cleveland; Thomas J. Kirby, Ph.D., University of Pittsburgh; Marion J. Mayo, Ph.D., Eastern District High School, Brooklyn, N. Y.; Garry C. Myers, Ph.D., Juniata College; Reuel H. Sylvester, Ph.D., State University of Iowa; Clifton Oscar Taylor, Ph.D., Pratt Institute; John Picket Turner, Ph.D., College of the City of New York; Stella B. Vincent, Ph.D., University of Chicago; George R. Wells, Ph.D., Oberlin College; Frederick Adams Woods, M.D., Massachusetts Institute of Technology.

The report of the treasurer was read as printed below, and accepted.

An invitation to hold the next annual meeting at the University of Pennsylvania was presented, and it was voted to accept the invitation and to fix upon Philadelphia as the place of the next annual meeting, subject to later action by the Council.

On recommendation of the Council, it was voted that a stipend of \$250 be paid annually to the Secretary-Treasurer for his expenses in attending meetings and for clerical and other assistance.

A verbal report of the work of the committee on standardization of mental measurements was presented by the chairman, Professor J. R. Angell.

The report of the committee on psychology and medical education was presented by its chairman, Dr. S. I. Franz. The report was adopted, with thanks to the committee. It was voted that this committee be continued and that a sum not to exceed \$20 be appropriated to cover its expenses during the coming year.

The report of the committee on teaching experiments was presented by Professor G. M. Whipple. Samples of several printed forms were distributed, and criticisms and suggestions invited. The report of the committee was adopted. The resignation of the chairman was accepted with regret. The principle of rotation of membership on the committee was adopted, one new member to

be chosen each year. Professor E. A. Kirkpatrick was chosen to fill the vacancy caused by the resignation of Professor Whipple.

The Council reported that an effort would be made in future years to increase to a still greater degree the value of the meetings through augmented facilities for informal conference. It is hoped that the local committee in charge of arrangements for the next meeting will be able to arrange for an informal dinner and smoker on the evening preceding the first formal sessions. If possible, a private dining room in the hotel headquarters will be secured where all the members who so desire may gather for their meals each noon and evening during the meetings.

Professor F. M. Urban addressed the meeting on the function of the Association in the encouragement of research, and advocated the founding of a prize. It was voted that the President select a committee of three, of which the incoming president shall be a member *ex officio*, to consider the advisability, and the means, of advancing psychology by the method of offering prizes.

It was voted that the thanks of the Association be extended to Professor Angier and our other hosts for their welcome and hospitality, and the many kindnesses they have shown us during this meeting.

On motion, the meeting adjourned.

REPORT OF THE TREASURER FOR THE YEAR 1913

Dr.

To Balance from previous year	\$2,920.00
Dues received from members	272.40
Interest from July 1, 1912 to July 1, 1913	97.84
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	\$3,290.24

Cr.

By Printing and supplies	\$ 125.05
Postage	31.67
Express and telegrams	11.44
Reprints of Proceedings	15.37
Clerical and stenographic aid	53.42
Expenses of Secretary (1912 meeting)	51.25
Incidental expenses of 1912 meeting	8.35
Expenses of Committee on Methods of Electing Officers	26.10
Expenses of Committee on Psychology and Medical Education	72.09
Expenses of Committee on Nominations	7.10
Exchange on checks70
	<hr/>
	\$ 402.54

Cash on hand.....	9.62	
Balance in Fifth Avenue Bank.....	109.37	
Balance in Union Dime Savings Institution.....	2,768.71	
		<hr/>
		\$2,887.70
		<hr/>
		\$3,290.24

W. V. BINGHAM,
Treasurer

HANOVER, N. H.,
December 27, 1913.

Audited by the Council

ABSTRACTS OF PAPERS

ADDRESS OF THE PRESIDENT

The Mental and the Physical. HOWARD C. WARREN, Princeton University.

Science is not yet ready to adopt a metaphysics of mind and matter. But some working hypothesis of the psychoneural relation is needed in order to fix the scientific status of psychology. The double-aspect view (monodualism) seems to fit the conditions best. This conception of the relationship between mental and physical becomes clear when we examine the analogous relation between surface and mass in our perception of material phenomena. If mental and physical activity are two inseparable aspects of one series of events, then the scientific assumption of uniformity or "law" is extended from the physical into the mental sphere. The old anthropomorphic conception of choice and reason must be radically amended. In the light of modern science the presumption is that mental phenomena, including choice and reason, are as uniform as physical events. The burden of proof rests on those who deny the regularity and determinacy of human volition and human reasoning. Even teleology may be brought into line with the mechanistic processes of nature. Foresight is the conscious counterpart of purposive activity, which is due to distant stimuli preparing the response to contact stimuli by means of a complex nervous mechanism; the beginnings of this purposive activity are manifest far down the organic scale. Psychology should embrace both the inner and outer aspects of experience. It is the science of the relations between the individual and his environment. These relations may be studied either objectively as behavior, or introspec-

tively as events of consciousness. Behavior study is essential to an understanding of genetic problems; it serves also as a check on the data of introspection. Introspective psychology has disclosed uniformities among mental events; it claims recognition by science on the ground that science should include every branch which contributes to a unified view of the world. The Behaviorist himself admits that consciousness is a necessary instrument of research. Without it there would be no scientific observation or generalization. Sense perception and the logical processes require analysis quite as much as the facts and values which they reveal. Science must study its instruments as well as its data.

(This paper will appear in full in the March number of the *Psychological Review*.)

PAPERS READ AT THE JOINT SESSION WITH THE AMERICAN
PHILOSOPHICAL ASSOCIATION

The Standpoint of Psychology. J. E. CREIGHTON, Cornell University.

The physical sciences, based on the mechanical theory, do not describe concrete individual things, but seek to determine the *general* conditions and relations of material existence. Psychology has attempted to obtain information of the same type as those expressed in the laws of physical nature. Its laws, therefore, refer to the conditions of mentality in general, in abstraction from the *individualized* form of concrete minds. The question arises whether these abstract conditions of mentality have not ultimately to be expressed in physiological rather than in psychological terms. Is it possible to maintain that there are *existing* processes or modes of consciousness or even that there is any genuine scientific advantage in describing mental life from this point of view? Even if we grant, as it is probably necessary to do, that a psychological physiology or a physiological psychology is necessary, yet this type of science does not satisfy all the legitimate demands that are made upon psychology. There is also necessary a science of psychology, which shall deal with the concrete individualized form of experience and which shall express its results in terms of a different mode of uniformity from that of the natural sciences. Its method is teleological rather than causal, and its standpoint is that of the concrete self in its relations and functions. This type of psychology is no mere unrealized ideal, but is found in the historical systems and in

contemporary investigations. Its method of analysis is different from that of the existential psychology but not inferior either in definiteness or certainty.

Philosophic Problems of Experimental Psychology. F. M. URBAN, University of Pennsylvania.

Philosophy develops its own methods and problems independently. Its realm is the whole field of experience, part of which is cultivated by psychology the problems of which are just as much objects of philosophic speculation as those of any other science—neither more nor less. Philosophy can be of assistance to psychology by analyzing and refining the notions used in describing the phenomena of experience. The notions of introspection, probability, and the psychometric functions are used as illustrations. In trying to correlate mental states, as revealed by introspection, with definite groups of conditions one encounters the difficulty that no such group, no matter how carefully controlled, always produces the same mental processes. The judgments given on the comparison of two stimuli have the formal and material character of random events, and the question arises whether they do or do not depend necessarily on their conditions. The psychometric functions offer a problem of similar great generality, because the same question arises whenever we apply mathematical reasoning to the study of nature. The logical representative of causal connection is the idea of functional dependence. In actual application one cannot make use of the most general form of relationship, but one is restricted to certain classes of simple functions, called analytic functions. Two properties make these functions extremely valuable for our study of nature. They may be determined on the basis of a finite number of observations, and, once determined, their course may be followed up as far back or ahead as one pleases. It seems that the principle of causality is identical with the assumption that all the events of nature may be characterized by analytic functions. The way to advance the logical side of the question consists in dropping this assumption as a whole or in part and observing the consequences.

The Standpoint of Psychology. JOHN DEWEY, Columbia University.

The speaker dealt with the topic as it presents itself in the actual teaching of philosophy. Whatever may be the abstract theoretical aspects of the methodology of the two subjects, from the standpoint

of the present teaching of philosophy, the subject of philosophy is intimately tied up with the conceptions involved in the current teaching of psychology. It was pointed out that almost all the epistemological problems that are in the forefront of discussion today are what they are because of the fact that psychology is thought to afford scientific warrant for belief in a separate psychic or mental realm of existence, having its own self-contained entities, laws and systematizations, and for the belief that these psychic existences are either the primary immediate data of knowledge or else the terms and units out of which knowledge is composed. Hence such problems as whether we can know an external, material world, and if so, how; whether there is any reason for believing in such a world; whether the psychic event or "consciousness" modifies the real object in the act of knowing it; how mind and body are connected in acts of knowing and willing; whether a psychic existence can have physical efficiency; whether it falls under the law of causality applicable to physical existences, etc. The genuineness of such problems and the significance of the philosophy that deals with them is absolutely dependent upon the standing of the primary conception brought over from psychology. It was pointed out that if the "behavior" movement made much headway in psychology students (and future teachers) of philosophy would approach philosophy with such different preconceptions as radically to alter the subject-matter and method of philosophical discussion. In conclusion, the question was raised how far the fundamental assumption of current introspective psychology had itself grown up within psychology on the basis of its own scientific data and how far it was a heritage from the philosophy of Locke and Descartes. If it should turn out to be the latter, the circle of relationship between current psychology and current philosophy would be complete; so that however distant from the ideas of the seventeenth century philosophers prided themselves upon being, they would still be inquiring into their topics from the standpoint set by those ideas.

The Standpoint of Psychology. HUGO MÜNSTERBERG, Harvard University.

The speaker started with an account of the recent, much discussed declaration of protest of one hundred and six philosophers in Germany. They demanded that the faculties and governments create special professorships for experimental psychology, instead of

filling the chairs for philosophy with psychologists. They insisted that psychology is a special science which is nowadays detached from philosophy. The pamphlets of Wundt, Marbe, Hillebrand, take the opposite stand. Psychology and philosophy belong together, or, in more extreme form, philosophy is to be made dependent upon psychology. We have here in America the same contrasting views. The fundamental condition for bringing order into this chaos is the recognition that there exists not one psychological standpoint, but two, and that the two kinds of resulting psychology stand in very different relation to philosophy. The causal psychology must remain the psychology of our laboratories, but no causal psychology of logical or ethical processes can be a substitute for philosophy. Moreover no psychophysical research can contribute to the solution of the fundamental problems like the right or wrong of introspection, of psychical causality, of parallelism, of the subconscious. Every special fact of observation can be interpreted in either of the opposing theories. They must be settled beforehand by epistemology. The other standpoint of the psychologist is that from which mental life appears as the expression of a meaning. The resulting psychology is purposive. While the background of the causal psychology is a naïve dualism, the background of the purposive psychology must be a naïve realism. Every element of human experience can be treated from both standpoints. The biological behaviorism also allows both forms. The bodily action may be looked on as the substratum of the causal mental process or as the bodily expression of a purposive self. Only the purposive psychology speaks of that mental life of the individuals for which norms exist. It is therefore the only psychology which is directly related to philosophy. Yet the standpoint of the philosopher cannot be identified with that of the purposive psychologist either. He ought not to be interested in those mental acts by which the individual submits to the norms, and that is to the values, as this submission involves the acknowledgment of a realm of absolute values, the subjects of which are not individuals but an over-individual will. While causal psychology leads to no philosophy, teleological psychology leads to relativistic philosophy only. The analysis of the idealistic philosopher, who deduces the validity of the absolute values from the postulate of reality, precedes both and guarantees their definite rights in the system of our overindividual tasks.

STUDIES IN GENERAL AND SOCIAL PSYCHOLOGY

Images and Ideas. KNIGHT DUNLAP, Johns Hopkins University.

Images are not contents modally resembling the special sensation of vision, audition, etc., but are muscular sensations. They may therefore be observed directly only by introspection, although other means of observing the total complex (muscle contraction), of which the image is a part, are important for the investigation of the conditions of thought. "Introspection" as here used signifies nothing more than the observation of images (muscle sensations) and feelings. Perceptual consciousness is conditioned by the arc reflex from non-muscular receptor to muscle; consciousness of pure feeling by the reflex from receptor to gland. The reflex from striped muscle to striped muscle conditions directly the consciousness of muscular action, and derivatively the thought of the object given originally by the perceptual reflex whose *terminus ad quem* is the *terminus a quo* of the thought-reflex. The idea is therefore the derivative content of the thought consciousness, and does not include the immediate content, or image. The image, as it is conventionally described, masquerades in plumage stolen from the idea.

Cannot Psychology Dispense with Consciousness? ELIOTT PARK FROST, Yale University.

The present paper attempts an explanation of what is usually ascribed to consciousness, on a strictly physiological basis. How can we explain the fact that things not only are, but that they get reported? If we consider "awareness" as a physiological and not a psychological term, a start will have been made.

"Awareness" shall then characterize the response of neural mechanism to stimulus. Iris reflex is a simple illustration. Such a sensori-motor arc may be called an "alpha-arc." An alpha-arc shall then characterize any simple, single, sensori-motor path initiated by a peripheral stimulus, and resultant in some end-effect. When alpha-arcs involve higher cortical centers, a further neural beta-arc may be aroused in the association centers. Beta-arcs are then like alpha-arcs, save that they take for their objects, just prior alpha-arcs, and the end-effect is modified by complication in terms of previous neural experience.

Such beta-arcs the writer terms "consciousizing processes." Their biological significance is to allow of the modification of ordinary reflex behavior in terms of the past experience of the

organism. No arcs, alpha or beta, are self-sensing, but any arc (beta, gamma, etc.) may become aware of any previous arc (alpha, beta, etc.). Such awareness is what is commonly termed "consciousness."

Alpha-arcs not arousing beta-arcs are called "pre-consciousizing processes" (reflexes); while arcs that once aroused such beta-processes, but no longer do so, are called "consciousized processes" (habits). Behavior would appear to be completely and most simply explained by the mutual functioning of groups of alpha- and beta-arcs, without the confusion of the hypothetical "consciousness."

"Sensations" then are not "first things in the way of consciousness," but the second. There must always be at least two physiological processes, successive in time, for one to be a consciousizing process, or "sensation." The iris can never get a sensation. An alpha-arc might give "red-awareness"; the subsequent beta-arc, if aroused, would then give "sensation-of-red." Can either introspection or logic demand any further characterization of "sensation-red experience" than to say that a nervous impulse has passed through the cortex and there aroused a second impulse which takes it as its object?

Physiological processes are not the *vehicle* of the psychic, but *are themselves* just what and all we can mean by consciousness. Neither introspection nor logic can demand any further "elementary psychic process," or "knowing function."

The Aufgabe and Intellectual Inefficiency. MARGARET F. WASHBURN, Vassar College.

An essential characteristic of an idea which assumes the function of a directing idea or *Aufgabe* is that it associates with itself a bodily attitude which may be called the activity attitude. The *Aufgabe* may drop out of consciousness and still influence associative processes if the organic-kinæsthetic fusion resulting from the attitude remains in consciousness. The *Aufgabe* recurs to consciousness, after an interval during which it has ceased to act, through the spontaneous tendency of the activity attitude to recur or persevere; the recurrence of the attitude recalls the *Aufgabe* associated with it. There is a purely physiological factor, unrepresented in consciousness, which helps to determine whether or not, at a given moment, a given idea shall be associated with the activity attitude and become an *Aufgabe*. The unpredictable character of this factor, depending on the physiological condition of the organism,

is responsible for the illusion of free-will in the acceptance of *Aufgaben*.

The activity attitude tends spontaneously to relax sooner or later. Its duration is in part determined by physiological conditions, but is influenced also by a psychological factor. The relaxation of the activity attitude is hastened by too much attention given to the sensory accompaniment of the attitude: to the attitude of working rather than to the work itself. Three types of intellectual inefficiency may be explained on this hypothesis as to the nature of an *Aufgabe*: the lazy person, the spasmodic worker, and the fickle worker. The lazy person seldom assumes the activity attitude. The spasmodic worker quickly releases it, although he may recur to the same task repeatedly after intervals of relaxation. His activity attitude relaxes too soon, partly at least because he gives too much attention to the attitude itself and thus lowers the threshold of fatigue. The fickle worker is characterized by long-continued single periods of activity, but when he has once dropped a task he tends not to recur to it. His activity attitude has been so long continued that the unpleasantness of extreme fatigue associates itself with the ideas of the *Aufgabe*, so that subsequent recurrences of the activity attitude fail to recall effectively this particular task.

An Historical Survey of Psychological Methods. CHRISTIAN A. RUCKMICH, University of Illinois.

Four different interpretations are found in the usage of the word "method" in a study of more than a score of systematic works in psychology: (1) general mode of investigation of phenomena, *e. g.*, "experimental method," "introspective method"; (2) a specific type of procedure for purposes of control or treatment of data, *e. g.*, "method of impression," "statistical method"; (3) point of view taken or intention assumed in an investigation, *e. g.*, "genetic method," "descriptive method." These three are methodetic, but the last is logical in nature: (4) the type of reasoning involved in the pursuit of any of these three or in the systematization of the results obtained, *e. g.*, "inductive method," "synthetic method." The use of the first three classes of method is traced through the history of psychology from Aristotle to the beginning of the nineteenth century by interpretation of the works of representative psychologists and from that time to the present by a classification of the expositions of method as given in the systematic treatises of the leading authorities. The most important feature of the develop-

ment of method is its derivation on the one side from casual observation and occasional experiment, and, on the other, from the functions of the "inner sense." A constant shift of emphasis on one or the other of these factors is marked. The final movement toward experimental procedure took place soon after Kant's refusal to admit psychology to the rank of a science. From that time on, with the refinement of experimentation, the use of "method" was broadened to include the second meaning in addition to the first and third. The modes of investigation, however, also received critical treatment and became more sharply defined. The establishment of psychology on an empirical basis as a science took two directions: (1) the widening of the scope of psychology to include comparative and physiological aspects, and (2) the application of quantitative methods. At present, the main differences between the various systems which grew out of this development of the science lie in the several senses in which the principal methods are used, and in the several evaluations of the methods. Uncontrolled introspection, for example, is considered by one group of authorities as a method which may contribute facts to the science, by another, as wholly useless to the science. Again, some authors maintain that experiment can control conditions affecting both introspection and general observation of organic movements, while others declare that its realm is psychophysics, physiology, or the simpler mental processes and complexes.

It is essential that systematic writers come to terms on the evaluation and interpretation of the various methods, and also on the usage of the word "method."

An Historiometric Study of Eminent Scientists. FREDERICK ADAMS WOODS, Massachusetts Institute of Technology.

This investigation was designed primarily to furnish an objectively derived working list of the leading names in the history of the natural and exact sciences. Three leading encyclopædias have been utilized, as a standard for inclusion,—the *Encyclopædia Britannica*, *La Grande Encyclopédie* and *Meyers Konversations-Lexicon*. Out of these the 1,300 most prominent scientists have been selected from each encyclopædia so that three lists contain the names of those to whom the greatest amount of printed space is allotted. About 300 names appear in all three lists, and are called Class A. Class B consists of about 450 who appear in two of the three lists. Class C those who appear in but one of the three lists

(about 2,100). The rise and fall of scientific activity can then be measured. The most significant changes are the rise in Germany during the nineteenth century and the decline in France. These changes are probably due to environment and not to heredity, but the cause of the change is not quite evident. There is apparently little bias of the editors of the encyclopædias towards their own countrymen as regards scientists of the highest eminence, or men long dead. This bias is much stronger towards living men and less eminent men. In historiometric work some triangulation or other method of objective proof is necessary. Confirmation from various points of view, and convergence of results will lead towards increased certainty, and a progressive inductive science.

Some Characteristics of Judgments of Evaluation. H. L. HOLLINGWORTH, Columbia University.

In most of the numerous studies by the method of relative position the method has been used chiefly as an instrument in the investigation of some specific problem, such as family resemblance, interests of children, value of advertisements, measurements of school progress, distribution of eminence, etc. Little attention has been paid to the characteristics and behavior of the judgments themselves. When the various studies are considered together a number of interesting problems arise concerning the judgments themselves. The paper points out some of these problems, and reviews the available material, suggesting tentative conclusions and further problems. Among these problems are the following: (a) The relative advantages of the strict order method, the method of paired comparisons, and the group method. (b) The variability of judgment in different parts of an experimental series, and the reasons therefor. (c) The certainty of individual preferences and aversions, as indicated by the variability of judgment. (d) Group variabilities and differences in likes and dislikes, as indicated by the unanimity of judgment. (e) Measurements of personal consistency and of judicial capacity, as indicated by individual variability and agreement with the group average. (f) Personal consistency in different situations, individual differences in this respect, and the problem of general consistency. (g) Judicial capacity in different situations and the question of general or abstract judicial capacity. (h) The relation of variability of judgment to the length of the experimental series. (i) The various quantitative criteria of the subjectivity of judgments, and the relations between these various

criteria. (j) The amount of agreement between diverse groups of observers.

(This paper will appear in full in No. 29 of the *Archives of Psychology*.)

Composite Group Judgments. WALTER DILL SCOTT, Northwestern University.

In social psychology we discuss the causes of group action so far as it is affected by social contact. If we are to retain the introspective method it must be the introspection of the individual member of the group. The students in our classes are members of groups whose action can be readily studied. Each student is a member of a group that selects electives in the course of study and in which the selection is dominated by social contact. Each student is a member of a college community that attributes prestige to individuals of the group. Each student is also a member of a home community that bestows respect on certain members of the community. About 200 students in social psychology applied the method of Order of Merit to each of the three following classes of data:

Rank in order of importance the motives which determine the election of studies by your 1,000 fellow students. (10 motives specified.)

Rank in order of importance the qualities that give prestige to the 1,000 college students (provided with a list of 8 such qualities).

Who is most respected in your home community—the *successful* business man, lawyer, minister, physician, or professor? Rank the five in the order in which they are regarded in your community.

The attempt to answer these questions is not only a good exercise for the student in social psychology but the answers are illuminating to the professor in charge.

On the Psychology of Having Friends. GEORGE A. COE, Union Theological Seminary.

Friends' mutual enjoyment of each other offers for analysis a social experience that is easily accessible to the psychologist, and that is rather promoted than hindered by reflection upon it. The naïve understanding of this experience asserts: (1) That what each friend enjoys is the other friend, not merely goods to be mediated by him, and (2) that the reason why a giver is valued above his gift is that a giver has experiences. Apparently, then, we value objects not only as experienced but also as experiencing.

What has psychology done with data like these? In general, it has investigated social intercourse from the standpoint of the mechanism of the process, and from the standpoint of knowledge, but in only minor degree from the functional standpoint. Particularly, the kind of value realized when a friend simply "has" his friend, and the kind of adjustment therein achieved, have received scant attention. *A.*—Something has been done with specific phases of social intercourse, as suggestion and imitation. *B.*—Genetic study has shown that the process of attaining self-consciousness is at the same time the process of defining our social objects. *C.*—Eight kinds of answer have been given to the question "How do I know that any other mind exists?" They range from "I see and hear my friend," through "I infer by analogy," "I postulate," "I intuit," all the way to "There is continuity of substance between minds," and even "Individuals overlap." None of these theories gives a sufficient account of the kind of value involved in "having" a friend, or of the relation of this value to the "having." *D.*—Psychology has determined that other-regard is not merely refined self-regard. This is one step toward a psychology of social values. *E.*—Psychology has raised the question, what is the "psychological" point of view with respect to such multiple experiencing as friendship asserts itself to be? No decisive answer has been given. If I as psychologist consider myself and my friend merely as content of experience-in-general, conversation being treated as internal discourse, and conversers as merely slower parts of the conversational flow, I am unable to construe "having a friend" in any sense that I can recognize as true description when I enjoy the experience itself. It does not appear that psychology can either deny or translate into anything else the naïve assertion that I enjoy a second experiencing.

Punitive Justice and the Social Consciousness. ELLSWORTH FARIS,
State University of Iowa.

In the tribes of the Equatorial Congo there are large numbers of the population who are not subject to any form of punishment. This fact has a bearing on the theories of the origin and future of punishment.

The reaction of the group toward a criminal may be one of three: it may be an immediate and instinctive resentful attack; it may be a social attitude in which the interests of the offender are still considered identical with those of the group; or it may be an inter-

mediate attitude in which the offender is an enemy to some of the group and a friend to others. The first of these reactions is war, the second is one of relatively complete socialization with no place for punishment, while the third alone offers the possibility of punishment.

The primitive group is founded on heredity. To a large number of the tribe there are only two classes into which all the race is divided: kindred and enemies. A harmful act on the part of enemies or strangers is the signal for attack. It is an immediate and instinctive reaction of revenge and retaliation whose object is the destruction of the enemy. The attack goes beyond and often is opposed to self-interest. Neither the state of mind nor the overt reaction is a genuine punitive situation.

It is equally impossible to punish those who are within the group. The interests of the members are identical. If an offence occurs there may be and is expressed disapproval, but no punishment.

Punishment arises when the group becomes complex, when the bonds are not too strong to be broken and when the offence is not serious enough to break it entirely. Only when the offender remains within the group is he punished, otherwise he is destroyed.

Since punishment is taking of vengeance by part of the group, modern criminal practice is coming to discard the category. The most enlightened procedure is an attempt to bring back the offender to a place within the group.

Intoxication in Religion. JAMES H. LEUBA, Bryn Mawr College.

This paper attempts to establish three theses: (1) In all, or nearly all, non-civilized peoples states of intoxication are looked upon as religious states *par excellence*: they are designated as God-possession. (2) In the religions of civilized nations, and in particular in Christianity, similar states, *i. e.*, ecstatic trances are likewise looked upon as union with the divine. (3) The reason commonly offered for the identification of intoxication and trance states with divine possession, namely, the apparently superhuman character of these states (visions, anæsthesias, etc.) and the alleged superhuman powers and knowledge which come to a man when in this condition, does not account adequately for the amazing attractiveness of intoxication. This is apparent in the fact that intoxication retains its hold upon a man when it ceases to be regarded as divine.

In an analysis of intoxication consciousness, the author uncovers the more fundamental reasons for the place secured by intoxication in religion.

Three methods of producing religious intoxication are described, the chemical (various drugs: peyote, soma, alcohol) the mechanical (rhythmic dancing), and the psychical (as in the Yoga practice and in Christian mysticism).

STUDIES IN EXPERIMENTAL PSYCHOLOGY

The Influence of Distractions on the Formation of Judgments in Lifted Weight Experiments. DAVID MITCHELL, University of Pennsylvania.

The investigation involves the problem of attention and attempts to answer questions, similar to those raised by Münsterberg, Titchener, Wirth and others, by the use of a technique and methodology much more refined than these workers had at their disposal. The judgments in experiments with lifted weights, obtained and treated by the method of Constant Stimuli as developed by Urban, are the basis of this discussion. Two kinds of distraction were used: (1) While the subject gave all attention to the judgment of the weight a distracting sound stimulus was presented. (2) At the same time that the subject lifted the weight he had to count discrete sounds, that is, a second mental operation was carried on. During the investigation approximately 75,000 judgments were made and on the basis of these the following conclusions are given.

First: Contrary to the traditional view, distractions (a) increase the precision of judgment, that is, the subject's judgments are more consistent, and (b) cause an overestimation of the weight, or in other words, with a decrease of attention there is an increase in sensation intensity.

Second: With distraction the sensitivity of the subjects is increased, the upper and lower difference thresholds being nearer together.

Third: The current division of attention into voluntary and involuntary may not be valid, the method used here suggesting a more satisfactory way of evaluating such psychical processes.

On a Reduction of the Practice of the Method of Constant Stimuli. SAMUEL W. FERNBERGER, Clark University.

It would seem that the labor of the calculations of the method of constant stimuli has been reduced as much as possible. Any further reduction of the practice of this method, therefore, must consist in a shortening of the experimental technique by means of which the

empirical data are acquired. This may be accomplished in either of two ways: by being satisfied with a smaller number of judgments upon each comparison pair, or by a reduction of the number of pairs. The number of pairs which should be used has been settled chiefly for reasons of convenience, and the usual number for experimental studies has been seven pairs.

The present study is an attempt to determine, experimentally, the effect of the elimination of the two extreme intensities of the comparison stimuli. Two series of lifted weights were employed; one, an extended series of seven pairs of stimuli; the other, a reduced series of five pairs. These were mingled in such a way that the results from both were taken simultaneously. The space errors were eliminated and the time errors were kept constant. Six thousand judgments were taken from each of three subjects. The averages for all three subjects, of the values of the interval of uncertainty for the extended and the reduced series, show a difference of only 0.07 gram. The point of subjective equality shifts somewhat; being 0.34 gram lighter for the reduced series than for the extended series. Hence it would seem that the elimination of the two extreme values of the comparison stimuli makes practically no variation in the determination of the sensitivity of the subject. Such an elimination, obviously, reduces the time and labor necessary for the acquiring of the data upon which the calculations are based by nearly one-third.

A complete series, under exactly similar objective conditions, was taken from a fourth subject, but his results were of such a nature that they must be treated separately. In one series, of twelve hundred reactions, he failed to give a single equality judgment; so that, in this case, the determination of his interval of uncertainty is zero. Hence we conclude that the subjective attitude, as well as the objective conditions of the experiment, constitutes a factor in the determination of the interval of uncertainty.

The After-Effect of Visual Motion. WALTER S. HUNTER, University of Texas.

The visual motion was produced by black and white strips rotating about a horizontal axis. The motion was viewed through a screen with an aperture $4 \times 7\frac{1}{2}$ in. Six subjects have been used.

The author has obtained results which require an interpretation upon the basis of eye-muscle strain due to inhibited tendency to follow moving lines. This is the same factor which experimenters,

Carr in particular, have found effective in producing the motion in the autokinetic illusion. The following facts may be given in support of the above: (1) The after-movement (a.-m.) is in general in the same direction as this strain. (2) The appearance of the a.-m. may be inhibited by vigorous straining of the eye muscles in the fixation during the real movement. (3) Eye movements, confined to central area of drum, plus winking and general muscle strain will prevent the appearance of the a.-m. even though a negative after-image of the aperture is obtained. (4) If a mirror be placed below the rotating drum so that the motion is seen going in opposite directions, eye-muscle strain may prevent the appearance of all a.-m., or it may control the a.-m. either on the drum or in the mirror. Often the a.-m. which opposes the direction of strain is controlled while that going in the same direction is unaffected. (The last three points indicate methods of "covering up" the strain incident to control of the "follow tendency." Such methods inhibit the a.-m.) (5) If one eye is stimulated by the movement, an a.-m. may be seen with the other eye either on the stationary drum or upon a printed page. No negative after-image of the aperture appears in the unstimulated eye. This a.-m. is not sharply localized and can be accounted for on the basis of the harmonious action of the muscles of the two eyes. (6) The stationary drum may be made to appear to rotate either up or down by straining any eye muscles in the corresponding directions. (These two points show the isolated effect of eye-muscle strain.)

It is not contended that the muscle strains alone are the effective conditions of all a.-m. Both the fading of after-images and association factors are influential as shown by data accumulated. Wohlgemuth has opposed the after-image theory on the ground that constant stimulation soon results in uniform fatigue. If this were true, no *movement* could be seen, as is evident from rapid rates of rotation.

Absolute Pitch Memory. J. W. BAIRD, Clark University.

Absolute pitch memory is subject to wide individual variation; when the eighty-eight tones of the piano were presented in irregular order, our nine observers made the following percentages of correct identifications (264 or more judgments by each observer): 99, 97, 89, 73, 62, 51, 41, 32 and 26. Tones from the middle region,—the once-accented and the twice-accented octaves,—are most accurately identified, and tones from the sub-contra octave are least

accurately identified. Relatively few errors are made with piano tones; then follow, in order of increasing difficulty, pipe organ (diapason, reed, string, flute qualities), flute, clarinet, forks, voice (tenor, contralto, soprano, bass). A determination of the limits of pitch within which each tone of the octave (naturals only) is still identifiable shows an overlapping in every instance,—for instance, a tone of 545 vibrations is sometimes identified as *c*, sometimes as *d*. (These determinations, however, were made by means of the *Ton-variator*; and all of the observers reported that tones of this clang-tint were exceedingly difficult to identify.) All observers agree in identifying the *note* more accurately than the *octave* to which it belongs,—a circumstance which seems to support the view (Révész, Köhler) that tones possess an attribute of character in addition to their attributes of pitch and clang-tint. The testimonies of all nine observers agree in asserting that absolute pitch memory is not a product of deliberate training and practice.

A Case of Color Hearing. HERBERT SIDNEY LANGFELD, Harvard University.

The phenomenon of color hearing of a talented musician was examined twice,—a period of seven years intervening between the two investigations. It was found that the colors agreed even to the subtler nuances. In the later investigation the colors accompanying certain chords and the difference between consonance and dissonance as regards the resulting colors were noted.

(This paper will appear in full in the March number of the *PSYCHOLOGICAL BULLETIN*.)

The Relation between Complementary and Contrast Colors. FLORENCE M. KUNKEL and HELEN D. COOK, Wellesley College.

The paper reports experiments investigating the relation between the quality of colors which pair off as complementaries, and those which mutually induce each other in simultaneous contrast. The method was that of making color equations by means of rotating disks of colored papers. Both complementary and contrast colors were formed by the usual procedure. The results agree with those of Tschermak (PFLÜGER's *Archiv*, 1907) in showing that the contrast color is both redder and bluer than the complementary. The discrepancy is slight for red and for green, large for yellow and for blue.

The anomaly is explained by Tschermak as being due to reddish-

blue adaptation of the eye in ordinary daylight. If this were the case, the direction of the anomaly could be changed by artificial adaptation to different colors. Experiments under conditions of artificial color-adaptation, however, show no variation in the direction of the anomaly, and only negligible variations in its amount, whether the eye be adapted to red, blue, yellow, green, gray, or to ordinary daylight. Evidently, therefore, Tschermak's explanation is inadequate, but the experimenters have no better one to offer.

Supplementary tests with complementary colors, simultaneous contrast and negative after-images, show that the anomaly for blue and for yellow is even greater in the case of the negative after-image than it is for simultaneous contrast. For a blue and a yellow that are complementary, the simultaneous contrast colors are orange and violet respectively, and the negative after-images are a still redder orange and violet.

A Corrected Color-Terminology. CHRISTINE LADD-FRANKLIN, New York City.

It is wrong for people who wish to think consistently in a scientific fashion to permit the term *color* to be used with its present ambiguity,—as both including and excluding the series of grays. The term is absolutely needed in the inclusive sense, and there is a simple means at hand by which to make it unambiguous,—for color proper, there is no reason why we should not say *chroma*. We have already all its derivatives in common use, dichromatic, achromatic, tetrachromatic (for normal four-chroma vision). The Germans already discriminate between the *toned* and the *tone-less* colors, and we should be equally exact. For the grays, including black and white, we have at present no word indicating their quality;—I propose to make use of the term *achroma*. (I find the word already in existence in the dictionaries of medical terms.) With these two names for the specific and the non-specific light-sensations, we have at once two good words for the *degree* in which each sensation-constituent is present in, say, a grayish-blue: we can speak of its chromaticity and of its achromaticity. At present we have for these two perfectly definite sensation-qualities only “degree of saturation,” which is too vague, and “degree of non-saturation,” which is very roundabout, and which, moreover, is a phrase that does not exist,—at present the sensation *quale*, though perfectly distinguishable, is not named.

There are four unitary colors proper, or *chromas*, and four series

of color (chroma) blends. The words orange and purple should never be admitted into scientific speech,—non-unitary colors should not be given unitary names. Just as there exist no unitary names for the yellow-greens and the blue-greens, so we should, in the other two series of color-blends, speak always of the red-blues and the red-yellows.

The term *brightness* has been thoroughly vitiated for scientific use by the absurd color theory of Hering;—his followers mean by it three things at once: (1) brightness in the real sense; (2) an assumed whiteness-constituent (though the color may be, for sensation, perfectly saturated); and (3) an imagined dissimilation-process which is taken to be its physiological correlate. Since it is impossible to rescue this word, at present, for its correct meaning, it is indispensable to discard it entirely. Its place should be taken by luminosity, or subjective intensity. Hering has said lately that those who can accept neither the psychological nor the physiological conceptions which lie at the base of his theory, may nevertheless be grateful for his terminology. But in fact his terminology, as regards "brightness" at least, is almost worse than his theory. His theory is, moreover, so bound up with his baseless terminology that the simple restitution of the term brightness, for instance, to its natural and unambiguous signification (subjective intensity or luminosity) would suffice, I have no doubt, completely to upset his theory. It is the surreptitious introduction of Hering's hypothesis as to the physiological substratum of brightness under this triply ambiguous term that permits one to be oblivious of the untenableness of the theory. A corrected color-terminology, therefore, far from being immaterial, is bound to have important logical consequences.

Deficiencies in the Method of Flicker for the Photometry of Lights of Different Colors. C. E. FERREE and GERTRUDE RAND, Bryn Mawr College.

(This paper will appear in full in the PSYCHOLOGICAL REVIEW.)

Color Preferences in School Children: A Contribution toward Method. MABEL R. FERNALD, Chicago Normal College.

This study represents an attempt now in progress to discover the main lines of color preferences in one group of 38 school children between the ages of six and eight. In a preliminary series of comparisons of the four colors of the Milton Bradley series (red, blue, green and yellow) certain results appeared which seemed to require

further evidence with control of certain factors before they could be accepted as generally valid. The most striking of these results were a marked preponderance of preference for blue when standard colors were compared, and a shift to red (pink) when the tints were under consideration. It appeared from this that hue is not the only factor to be considered in connection with color preference, since in the case of red and blue at least the preferences shifted from one to the other with a shift in brightness of the colors compared. An attempt was made in this preliminary series to discover the effect of background on the result, by the use of white, gray and black cards, but these variations did not appreciably alter the situation.

In the more careful attempt to study the factors involved the following are the main points which have thus far appeared: (1) Under the conditions under which we worked the method of paired comparisons seemed applicable to the majority of children tested, though a few failed to make consistent selections. (2) The question of the particular red or blue or other color used seems important when any given series of colors, such as the Milton Bradley, is used. For example, our experiments showed that the standard red of this series is not a representative red in the sense of being the red best liked by these children. The standard orange red is a much greater favorite and is often referred to by them as a "redder" red than the other. For purposes of æsthetic comparison with other colors, therefore, in the case of young children the standard orange red seems the better qualified to represent the red group, and we are so using it in other tests at present. (3) In the red and the blue series, each containing three tints, three standards and three shades, we obtained confirmation of the common statement that children like the more saturated colors, since the standards were most frequently chosen. Secondarily there was a selection of the tints in preference to the shades.

Various other indications of our results are now under observation with children of the same and different ages with a view to determining to what extent age and sex affect the results.

STUDIES IN COMPARATIVE PSYCHOLOGY

Color Blindness of Cats. L. W. COLE, University of Colorado.

Of eight cats two confused yellow with a gray and with each of twelve colors of nearly the same flicker equivalent as the yellow. Two others confused blue with a dark gray and with four colors, one of which was a very different blue. Two other animals con-

fused green with a gray and with each of seven colors which were of nearly the same flicker equivalent as the green. Another pair of cats confused red with black and with each of nine colors. The colors and grays which were confused with red and blue varied widely from them in flicker values. This fact and most of the confusions would find a consistent explanation if the cat sees a much shortened neutral gray spectrum with its ends at or in red and blue respectively. Before a confusion area of the spectrum was reached and after it was passed through there was an area of "difficult discrimination" in which the animals required about three hundred trials in order to discriminate. Hering grays were useless for the experiments.

Two persons with dichromatic vision were asked to sort these colored papers as Holmgren worsteds are sorted. Each of the dichromates made five confusions which had been made by the cats. Both of the dichromates and the cats agreed in the matches (confusions) of two pairs of colors, and for each of these pairs the flicker equivalents were identical.

In the light of Ives's results (*Phil. Mag.*, 1912), which show that the flicker method is superior in both "sensibility and reproducibility" to the method of equality of brightness, flicker values can hardly be ignored. (The work of Polimanti, *Zsch. f. Psychol. u. Physiol.*, 1889, is also significant.)

Most of the experiments were made by two graduate students, Mr. C. J. DeVoss and Miss Rose Ganson.

A Method of Testing Visual Acuity and Pattern-discrimination in Animals. H. M. JOHNSON, Cleveland, Ohio.

The present work is being carried on at the Nela Research Laboratory, National Lamp Works of the General Electric Company. The purpose is to discover to what extent vertebrates can react to differences of visual detail under given conditions of illumination. The problem of size- and form-discrimination as now defined does not include this question. The method of studying that problem as standardized by Yerkes and Watson is inconvenient, owing to the difficulty and necessity of controlling other stimulus-factors than the one under study. It is also not adapted to quantitative tests on form-discrimination, since it does not permit of change by insensible gradations from one stimulus-value to another.

"Pattern-discrimination" is here used as meaning discrimination

between two visual fields equal in area, form and illumination as a whole, differing only in the respective distribution of light from them. Four elementary problems have been set: the stimulus-threshold for striation; the difference-threshold for size (and conversely for number) of strata; the difference-threshold for direction; and the difference-threshold for contrast.

For the first three problems the test-fields are prepared by superposed gratings, as suggested by Ives and built and first used by Cobb, whose mountings required no essential modification. The apparatus meets all physical requirements. It is being used with the Yerkes box and the discrimination method on the dog, the monkey and the chick. Results obtained to date are only preliminary. The dog learned in 18 days to discriminate between a plain and a striate field at a distance of 60 cm. and over. The test-bands on the striate field were about 0.25 cm. apart. The learning curve shows a quick descent, no reversals and very short plateaux after the 11th day, when punishment was introduced. This indicates that the method is practicable.

Attitudes of Appetition and of Aversion in Doves. WALLACE CRAIG,
University of Maine.

Many of the instincts of birds are not overt reactions affecting simply and directly the environment. Many are attitudes, affecting the bird himself, keeping him restlessly active, trying now this and now that, until at last he gets from the environment that particular stimulus which sets off a final reaction (*end-reaction*) after which the bird appears satisfied and restful. An attitude which thus works until a certain stimulus is received, may be called an attitude of appetition. In some cases the appetitive attitude is an incipient end-reaction; in other cases it is different from the end-reaction. The stimulus sought, which is needed to activate the end-reaction, may be the stimulus of an entire situation, involving even memory factors.

Many instincts of birds are of an opposite type, namely, attitudes of aversion, which keep the bird restlessly active so long as a certain stimulus is present, but give him peace after he has succeeded in ridding himself of that stimulus.

It has been said erroneously that in animals there is no true distinction between work and play, that the animal's activities are all play. A dove may be observed to make repeated trials to overcome difficulties, enduring bodily injury, and continuing the

struggle for a long period, urged on all the while by an appetitive (or aversive) attitude tending toward a certain end-situation. This is work. Doves exhibit also conflict of attitudes, hesitation, and final overcoming of one attitude by the other. In certain cases the attitude which stimulates the agent himself, serves in certain cases to stimulate also other doves (patients) toward the same or correlative ends.

Regarded simply as observable motor phenomena (disregarding questions of intelligence, and of conscious states) these activities of birds seem to be the same as, only more simple than the behavior activated by desire, purpose, volition, in men.

Tests on Adaptive Intelligence in Dogs and Cats, as Compared with Adaptive Intelligence in Monkeys. W. T. SHEPHERD, Waynesburg College.

The paper is a report of experiments on dogs and cats to ascertain how they compare in adaptive intelligence with *Rhesus* monkeys. By the term adaptive intelligence, we designate a lower sort of reasoning: the ability to adapt to our purposes conditions more or less difficult and more or less unfamiliar.

In experiment I with the monkeys, food was suspended out of reach of the animal in the cage, but with a stick passed through the food, the end of which could be seized by the monkey and the food thereby pulled up to the cage and secured. Eleven monkeys were tested with this apparatus and all except one succeeded in the first trial. With the exception of a few trials the times of the animals were from 2 to 6 seconds. In two other experiments with the monkeys, their success was equally as marked, and the times of the reactions were similarly short.

In experiment I with the dogs, similar to experiment I with the monkeys, the results were wholly negative. The dogs scrambled about the cage, bit at the side of the cage next the suspended meat, etc., but made no effective effort to secure the food as had the other animals. They appeared to have no understanding of the problem. The dogs also failed utterly in another test where the monkeys succeeded.

In experiment I with the cats, the conditions were similar to those in experiment I with both dogs and monkeys. In brief there was a total failure to understand the problem or to secure food. The cats also failed in the other test with them wherein the monkeys succeeded.

The writer concludes that in dealing with problems of the above character, cats and dogs are very inferior to *Rhesus* monkeys. This may be owing in part to the superior motor equipment of the monkeys. However he infers the general inferiority in adaptive intelligence of the former.

Types of Learning in Animals and Man. JOHN F. SHEPARD,
University of Michigan.

Thorndike's theory of reasoning and the tendency to look for higher mental processes in the mere presence of centrally aroused stimuli are equally consequences of the attempt to reduce everything to associations in the sense of one process re-arousing another together with something like Thorndike's Law of Effect as a means of establishing association. This view seems inadequate to explain certain experiments with men and animals.

When a normal person has learned a labyrinth and then this labyrinth is modified at some point, the person ordinarily definitely distinguishes the change and adapts to it. If he is confused as to the exact difference, he will probably make other errors in the neighborhood with or without going into that part of the old path which is now blind. Under similar circumstances the rats and cats show similar behavior, the abler requiring only one trial if the change is simple. Ants (when olfactory stimuli are ruled out of both learning and testing) continually go along the old path and require more repetitions to adapt than were required for the original learning.

Furthermore, ants and at least most rats and cats learn the labyrinth in general backwards from the food-box even though they have learned several different forms previously. Normal people learn rather more rapidly from the beginning than from the end.

Whether in terms of peripherally or centrally aroused stimuli, there is some difference in organization which gives the ant, the rat and cat, and the person different types of control of behavior.

It is suggested that the theory which gives association a character of inhibition as positive as excitation may be a possible explanation of this organization.

STUDIES IN EDUCATIONAL AND APPLIED PSYCHOLOGY

A Contribution to the Question of "Quick Learning, Quick Forgetting."

R. S. WOODWORTH, Columbia University.

The contradictory results obtained according as retention is measured by the saving in re-learning or by the amount recalled

make it desirable to introduce further variations into the study of the above question. One variation consists in avoiding the matter of individual differences, and examining the learning and retention of *single associations* by the same individual. In one of the experiments reported, an Italian-English vocabulary of 20 pairs of words was to be learned from auditory presentation. After one reading, the experimenter gave the Italian words as stimuli, allowing 3-5 seconds for each response, prompting and correcting, and so continuing till each correct response had been given once. Overlearning was avoided by dropping each pair from the list as soon as it was learned; but after all the responses had been correctly given, the experimenter read the whole list through once more. After an interval of 2-20 hours, the experimenter again used the Italian words as stimuli, and got the score of correct responses, and also a report of associative aids employed in remembering any of the pairs.

Under these conditions, the more quickly learned pairs were the better retained. Thus:

- Of the pairs learned in 1 reading, 73 per cent. were recalled after the interval.
- Of the pairs learned in 2 readings, 72 per cent. were recalled after the interval.
- Of the pairs learned in 3 readings, 63 per cent. were recalled after the interval.
- Of the pairs learned in 4 readings, 58 per cent. were recalled after the interval.
- Of the pairs learned in 5 readings, 38 per cent. were recalled after the interval.
- Of the pairs learned in 6-11 readings, 27 per cent. were recalled after the interval.

Since the aided pairs (pairs in which the subject saw some relation between the terms or developed some mnemonic to hold them together) were both more quickly learned and better retained than the unaided pairs, the advantage of quick learning probably lies partly in this association with aids. But this is not the whole story, for when the unaided pairs are considered by themselves, the quickly learned among them are better retained than the slowly learned; and, indeed, the quickness or slowness of learning makes more difference to retention where no aids are present than where they are present. We conclude that quick learning favors retention, and aided learning favors retention each independently; but that the two influences work together, inasmuch as the best aids suggest themselves promptly and promote quick learning.

An Experiment on Memorizing Versus Incidental Learning. E. A. KIRKPATRICK, Fitchburg State Normal.

This is the report of a preliminary experiment to test the value of memorizing as regards the efficiency of doing. The particular

thing learned was a portion of an advanced multiplication table. Normal students and sixth grade children were subjects. The methods were (1) memorizing, then using; (2) using at once guided by a key sheet of products; (3) computing the products. The memorizing or practice was continued eight and ten days. The final test of efficiency was writing as many answers without a key as possible in two minutes. The groups that practiced computing averaged the greatest number of answers. Those that spent all the time in practice next, and those that spent part of the time in memorizing wrote the fewest. Those that spent eight out of nine days in memorizing were much behind those who spent only four or five days out of ten in memorizing. The results in this preliminary experiment suggest that the traditional practice of learning and drilling on facts such as the multiplication table, then using them afterwards is wasteful as well as wearisome.

The most significant figures are as follows. The number of answers written in the two minute test after vacation was as follows:
Normal students.

Group of men memorizing five days and practicing with key five days, 40.9.

Group of men practicing with key ten days, 46.2.

Group of women practicing with key eight days, 25.4.

Groups of women (except four) practicing computing eight days, 44.3.

School children of sixth grade.

Group memorizing eight days and practicing with key one day, 10.1.

Group memorizing four days and practicing with key eight days, 27.4.

Group practicing with key ten days, 18.7.

Group practicing computing ten days, 27.7.

A Class Demonstration of Transfer of Training. DAVID CAMP ROGERS, Kansas University.

Previously reported experiments in transfer of training require several hours for completion. By choosing a habit which is modified with exceptional rapidity and which is highly measurable, viz., the habit of moving the right hand appropriately to spatial directions, one can give a demonstration of transfer within a period of fifteen minutes to half an hour. The training takes the form of reactions of the right hand to visual directions that are distorted by prismatic

lenses. The tests, to be made both before and after the training, may include (a) direct tests of the training; (b) tests in which the stimulus is entirely different than in the training, *e. g.*, the kinæsthetic perception of the hidden left hand; (c) tests in which the movement made is almost entirely different, *e. g.*, reading numbers to indicate the position of the hidden left hand. The transfer which appears in each of the two last mentioned series is explained through reference to connections which are directly tested in the complementary series. These same connections can be demonstrated by an independent experiment in indirect suggestion. The experiment illustrates transfer of a type which involves no conscious ideal, consciously formed conception, or improved habit of attention.

Percentage of Feeble-mindedness That is Hereditary According to the Degree of Defect. HENRY H. GODDARD, Vineland, N. J.

Early in the study of feeble-mindedness the author was impressed by the fact that the lowest grade children were more often children of good parentage than were the high grade children. The present paper with the accompanying curve shows the exact percentages for these different grades of feeble-minded.

If we plot mental ages along the abscissa and percentages on the ordinate and then draw the curve indicating the percentage of each grade that is hereditary feeble-mindedness, we have a curve which is nearly stationary from one to four years of age mentally, begins then to rise and rises steadily to seven and at that age is again nearly horizontal to eleven, the end of the feeble-minded list, showing the much larger percentage of feeble-mindedness that is hereditary in the higher grade than in the lower. This is what was to be expected from the fact that children of a mentality of four or under almost never become parents. The only exception is that sometimes an imbecile girl with the mentality of three or four may be seduced by some more intelligent person.

Beginning at five they marry and we have more hereditary cases. At six still more, at seven and from that on marriage with these people is habitual and we get our fairly constant proportion of 85 per cent. On the theory which is in the main fairly clear that intelligence is transmitted approximately in accordance with the Mendelian law we would expect that moron parents would have moron children, imbecile parents imbecile children, and if idiots do not marry then the question arises,—how do we have any hereditary idiots? The reply is that probably these are cases that would have

been imbecile or moron but some other cause has come in to reduce their mentality. We found this positively in a few cases. That is to say, a child of moron or imbecile parents who would have undoubtedly been somewhere near the same grade of intelligence, has had meningitis which has destroyed part of the intelligence that he would have had.

The following table gives the number of cases and the percentages for each age.

Mental Age.....	1	2	3	4	5	6	7	8	9	10	11	12
Cases.....	9	31	16	12	13	28	33	37	14	10	5	0
Per cent. Hereditary...	50	56.4	53.3	54.6	65	73.7	80.5	84.1	70	76.8	71.4	0

Data on the Influence of Race, Color, Nativity, and Truancy on the Answers to the Binet Tests. WALTER S. CORNELL, Director of Medical Inspection of Public Schools, Philadelphia.

The evidence furnished by the statistics quoted in this paper is mostly negative. This for the reason that these statistics were taken from examination of delinquent boys at the Philadelphia House of Detention, a class between nine and sixteen years of age and mentally of inferior grade. Under these circumstances it is not possible to demonstrate the effect of home and neighborhood environment as it does affect very young children in many cases. Nor was it possible to show the effect of truancy in a group of boys whose total mental equipment is usually the third or fourth grade at the age of 14 years, and this largely because of inherent inability to progress further in school. However, certain evidence in the case of younger children, not so detailed as the evidence in the principle group studied, is here presented.

The charts here displayed show the percentage of successful answers to the questions designed by Binet for children of 9 years, 10 years, 11 years and 15 years (Goddard's Revision). Altogether, 24 test questions were reviewed, 5 questions being contained in the group for each year except year 15, in which there are only 4 questions. Of the total of 24 questions the answers by the white native group and the white foreign group were practically alike, and therefore practically similar to the percentage for the total of all children of that age. In only five cases was there any difference and in these the difference was not marked. These five were the reasoning out of simple problems (IX 4) answered slightly better by the white native children; placing three given words in a sentence (IX 5) answered slightly better by the white native children;

arranging weights in proper sequence (X 5) answered better by the white native children; association test giving opposites (XV 4) answered slightly better by the white native children; repeating six numbers (IX 3) done better by colored children; and making change (X 1) answered after ten years of age better by the white native children, but at ten years of age by the white foreign children.

A corresponding attempt to demonstrate differences in the answers to the Binet tests in truant children compared to children of known good or fair school attendance proved correspondingly barren of startling results. In the 24 questions the answers of which were studied, 19 were answered equally well by the truants and by the boys who had been in fair or good school attendance. In three test questions, namely interpreting pictures and ability to write a message by the cypher code and giving opposites in the association test, the truants did slightly better on the average than the others. In the problem stories requiring correct conclusions the truants did slightly worse.

Turning from these negative results to a study of younger children the writer brings forward a study made on a number of small children attending the School of Observation and Practice connected with the Philadelphia Normal School. These children were all of a very good social station. Remarkably the answers to the Binet tests averaged two years above the Binet standards for age.

The two studies bring out the general truth that differences in the Binet answers due to environment will principally be found in younger children.

Preliminary Report of a Higher Scale of Mental Measurement. A. J. ROSANOFF, Kings Park State Hospital.

Standards which have been made available for use in practical psychiatry do not take sufficiently into account environmental influences; the difficulty of providing satisfactory correction of resulting error might be lessened by confining proposed tests to a selected sphere of knowledge or activity in relation to a corresponding and readily measurable *sample* of environment, so to speak, rather than the environment as a whole.

Only one general environmental element available as a sample has been in any degree standardized and is at least roughly measurable, namely, the element of systematic education: our special problem thus becomes to develop a simple method whereby a

subject's mental capacity might be estimated from what he has acquired in the course of his education in comparison with the average acquisition of a large group of subjects of the same degree of education.

The method proposed consists in the employment of a free association test applied by means of the following list of one hundred stimulus words: *geography, participle, Waterloo, refraction, arithmetic, botany, isomerism, Portugal, amœba, declension, burette, physics, hyperbole, retina, coagulation, Cervantes, franchise, subtraction, metabolism, predicate, mollusc, inquisition, amphibious, decimal, hydraulic, osmosis, percentage, cerebellum, fractions, titration, carbohydrate, duodenum, cosecant, biology, Odyssey, vertebrate, gravimetric, federal, morphology, hypotenuse, Magellan, hexameter, meteor, momentum, Cornwallis, protozoon, syntax, distillation, pollen, peninsula, binomial, crustacean, Bonaparte, meridian, chlorophyll, tetrahedron, Madagascar, corolla, ventral, Belgium, tangent, dorsal, colloid, equator, judiciary, synthesis, Athens, epithelium, feudalism, coefficient, perennial, plebeian, catalytic, embryo, spectrum, continent, spore, theorem, Himalaya, Renaissance, quotient, oxidation, hæmoglobin, axiom, Amazon, isosceles, cohesion, protoplasm, centrifugal, molecule, cotyledon, abscissa, gravitation, galvanic, logarithm, calyx, polarization, cephalic, proteid, kinetic.*

The plan is to collect a large number of test records from subjects of various degrees of education and thus to develop a series of standards. The special object is to employ the test, when normal standards are available, in the study of mental capacity in cases of insanity.

A small amount of material already collected seems to indicate: (1) that the number of "appropriate" reactions is in correlation with degree of education, and (2) that, the factor of education being constant, there is great range of variation which is tentatively assumed to be in correlation with native mental capacity or at least with educability.

The Legibility of Display Numbers: An Experiment in Applied Psychology. H. C. McCOMAS, Princeton University.

Tachistoscopic exposures of 20σ were given in three sets of experiments to determine:

- (A) Whether letters or numbers are most quickly read.
- (B) What arrangement of figures yields best legibility.
- (C) What style of figure is quickest read.

(A) It was found that the fourteen subjects observing the number and letter series averaged 4.52 numbers for an exposure, but only 3.69 letters. When four figures in a row were compared with a letter followed by three figures, the average number of symbols read, per exposure, was 4.12 for the former and 3.49 for the latter.

(B) It was found that the following sets of combinations are legible in the following order: (1) Six figures close spaced, thus; 295630. (2) Six figures spaced by twos, thus; 29 56 30. (3) Six figures wide spaced, thus; 2 9 5 6 3 0. (4) Six figures spaced by threes; 295 630. (5) Six figures with dash between twos; 29-56-30. (6) Six figures with dash between threes; 295-630.

The shortest line with fewest spaces or dashes is quickest read.

If the six figures are in two rows of three each, thus; $\begin{smallmatrix} 295 \\ 630 \end{smallmatrix}$, more figures are read than with the six in a row, 4.26 as compared with 3.87.

A Gothic style of numbers which will show when the 9, 6, 3 and 0 are superimposed by the 8 so that the 8 covers 100 per cent. of the 3, 95 per cent. of 6, 9 and 0, is obviously confusing.

The Gothic form was compared with an "Old Style" of type, which is not open to the above objection. The latter was found the more legible, 4.02 figures of the former being legible per exposure and 4.11 of the latter.

STUDIES IN PHYSIOLOGICAL AND ABNORMAL PSYCHOLOGY

Supplementary Report of the Effect of a Prolonged Fast. HERBERT SIDNEY LANGFELD, Harvard University.

At the time of making a series of psychophysiological tests upon a man fasting 31 days, a report of which was given at the last meeting of the Association, it was not possible to conduct experiments after the subject had begun to take food. A year later, however, the opportunity was given to make similar tests covering a period of six days on the subject under normal conditions. The tests used were the hand dynamometer test, the tapping test, the space threshold test, the cancellation test, memory tests and association and reproduction tests. In all of these the records were as good if not better than at the end of the fast, and it must be remembered that at that time many of the tests showed improvement. As might be expected the strength tests showed the greatest improvement, being even better than at the beginning of the fast. It seems, therefore, from these results that the fast did not have any ill effects and certain facts may indicate beneficial results.

(This paper will appear in THE PSYCHOLOGICAL REVIEW MONOGRAPHS.)

What Parts of the Brain Does Introspection Reach? E. E. SOUTHARD,
Harvard University.

Mind is more than consciousness. But it is improper to call the non-conscious parts of mind by such terms as *The Unconscious*, *The Subconscious*, *The Co-Conscious*, etc., since these terms attempt to vindicate some subtle kind of consciousness for that which is *mental-but-not-conscious*. That which is *mental-but-not-conscious* is the will and very possibly the groundwork of emotion. Will and emotion are only extrinsically conscious, that is, when their effects are rendered in kinæsthetic, gland-æsthetic, and similar terms. This scheme thus identifies consciousness with cognition and compounds of cognition.

Original data from insane hospital laboratories were presented which go far to show a correlation between lesions of the two association-centers of Flechsig and mental disease. Curiously enough, those forms of mental symptoms which look superficially like ideational disorders (delusions, disintegrations of personality) prove to be correlated more with lesions of the anterior association-center. On the other hand, various apparently motor disorders, (catatonia, catalepsy, even epilepsy) are actually often correlated with lesions of the posterior association-center. The anterior association-center is motor, expressive, pragmatic, *but non-cognitive, i. e., non-conscious*. The posterior association-center is sensory, impressive, conscious, *but non-pragmatic, except as receiving kinæsthetic and similar records or their derivatives*. Thus delusions or false beliefs may turn out to be pragmatic disorders, without the slightest evidence of cognitive disorder; and spasms or impulsive acts may be in some sense due to cognitive, that is, kinæsthetic, disorder, with an expressive mechanism intrinsically quite normal.

A study of casualty ward records both in the literature and in hospitals available to the writer shows abundantly that the severest destructive lesions of most parts of the brain are at times consistent with the preservation of that type of behavior we term "conscious." Especially is this true in the frontal region (cf. Crowbar Case, etc.). But the parietal areas, and particularly the right parietal area, seem to be more closely related to consciousness, in this sense of self-awareness. Lesions here, if the cortex is at all extensively destroyed, seem inconsistent either with the maintenance or the recovery of what we clinically term consciousness.

Warning should be uttered that the voluntary, non-cognitive, *i. e.*, non-conscious, portion of the mind, the pragmatic part thereof, is, although non-conscious, still an organ or perhaps *the* organ of spontaneity, of novel reactions. What kind of energy or thing this may really signify remains obscure.

Some Further Observations on Physiological Effects of Fear and Rage.
W. B. CANNON, Harvard Medical School.

Pain and the emotions of fear and rage are accompanied by an increased discharge of sugar and adrenalin into the blood. Pain and these emotions are associated with struggle to be free and with running and fighting (McDougall). The sugar is useful as a source of muscular energy. Adrenalin quickly restores fatigued muscle wholly or almost wholly to its original irritability. Injected adrenalin markedly increases the speed of coagulation of the blood. The adrenalin liberated in pain and the major emotions hastens greatly the clotting of blood. This reaction would be serviceable in case of injury to bloodvessels in conditions which rage and pain might involve.

The Freudian Child (and Ambivalence). G. STANLEY HALL,
Clark University.

Neither paidologists nor pediatricians have ever ascribed such importance to childhood as do the Freudians. Every dream, neurosis or psychosis, if only analyzed, reveals infantile determinants. Every form of Janet's "flight from reality," autism, normal day dreams, every lapse from apperceptive to associative thought, from the abstract to *anschaulich*, is a retreat towards the state of infancy. Art, poetry, myth, religion, are largely realizations of childish wishes. Thus the first three or four years of life are fateful for health, virtue and success. The Freudians cannot apply psychoanalysis directly to infants. In fact, only two have been studied with any detail. But they construct their child from the lives of great men and from pathological cases. Ferenczi and some others find in prenatal life the basis of a solipsistic *Allmacht der Gedanken* seen all the way from magic to ultra-idealism later. We sympathize with Stern's protest, endorsed in the Breslau meeting of physicians, against turning the analyst loose on children. Now, Freud says, "*Das Unbewusste ist das Infantile*," or that part of it which is repressed. It is where complexes are preformed, and these are mainly unconscious, and psychoanalysis is only a method

of getting at them. Yet we are now told that the future of psychoanalysis rests more with psychologists of the normal than with psychiatrists. The paper then discussed (a) the Oedipus complex; (b) the ambivalent masochism and sadism, which evolves into the aggressive and the passive type; (c) erethic sucking, *Wonnesaugen, Lutschen*, which is said to predispose to the erectile diathesis; (d) the claim that the very first memories of childhood are preponderantly of events really sexual; (e) the ambivalent *Schau- and Zeigetrieb*; (f) anal eroticism, and the origin of homo- and heterosexuality. The writer protested against Jung's large use of "libido" to include even appetite for food, insisting that the autos preceded the eros, pointed out that the Freudian child was only a fragment of a child, yet the traits studied were abnormal, and that the tendency to apply them to normal children was the great error of the Freudians and that a child in whom they were much developed was *per se* abnormal, but admitted that they were fundamental for health, virtue, success, so that paidologists, with the above large reservations, might call themselves Freudians.

The Pragmatic Advantage of Freudo-Analysis. KNIGHT DUNLAP, Johns Hopkins University.

Successful psychoanalysis by Freudian methods does not necessitate the discovery of the actual association at the base of the patient's trouble, but merely the building up of a new association which supplants the old, and the final breaking up of the substituted association. The conventionalized sexual symbolism is an admirable device for the formation of strong associations, but a long period of time is necessary.

Notes on the Mechanism of Continence. GEORGE V. N. DEARBORN, Tufts College Medical School.

It is now time that academic science, especially psychology, marked out the path for the advancement of real knowledge about sexual matters among the adult public. The problems most pressing for practical solution are chiefly psychological. As analysis of contrectation (Moll) at once shows, the genesial impulse involves potentially the entire epicritic receptive field, and this cenesthesia (physiologically a deluge of afferent impulses flooding the thalamus and the cortex) provides the neurokinetic tonus of part of the voluntary behavior involving the whole brain (desire). By association among the thousands of millions of neurones, this desire is

normally in humans sublimated into love. In the subconsciousness, as well as out of it, this tonus of impulsive cenesthesia flooding the psychomotor neurones with energy, is often a powerful initiative force in the constructive behavior of young adults,—its leading motor idea, involving the whole organism more or less. Repression (Freud) by way of secrecy and false shame keeps active that which should usually be latent and makes what should be under sub-conscious control, on a habit-basis, often strongly aggressive, incontinent. The neurology of voluntary movement involves factors more or less like the following (as suggested in a former paper): (1) *The Nervous Circuits, Kinesthesia*: A, Between muscles and gray cord; B, Between cord and brain; (2) *The Cerebral Influences of Spatiality*: A, Ocular and other visual muscles; B, Retinæ; C, Semicircular canals; D, Active muscles of limbs, etc.; E, Local signs; (3) *The Gray Fabric of the Hemispheres*: A, Ideas of usefulness; B, Memory-images of movements, etc.; C, Awareness of ability; D, Interests and emotional tones; E, Inhibition.

Skill apparently may be considered essentially a generalized or localized voluntary control based on the current fusion (at first conscious) of the two opposed but complementary phases of kinesthesia: one actuating, vegetative, and generally unconscious, the other inhibitory, personal, and conscious. Hormones originating at adolescence, by stimulating the development of the voluntary musculature, provide with the sexual impulse the means of its control. Continence, then, appears as an inhibitory generalized skill, grace, and cleverness, based in adequate conscious correlation of the lower centers with the higher, and in extensive and intensive voluntary and habitual control not only of the skeletal muscles but of the vegetative effectors to some extent.

Continence is not wholly an ethical and an esthetic matter, but one inherently and most intimately related to (and even an index of) the most *practical* phases of life,—capability, efficiency, competency, self-knowledge, initiative, personality, manhood and womanhood. Scientifically, then, incontinence appears as an index of a lack of personal culture, as clumsiness, inefficiency, stupidity, and failure, and should therefore become unfashionable. The genesial impulse developing in the adolescent is normally safeguarded by the simultaneous development of a consciousness of general voluntary bodily control and of the surpassing efficiency of his organism both actuating and inhibitory, somatic and mental. (This experience of "finding one's self" constitutes a criterion of

physiologic age which, partly because functional rather than structural, is more significant than others so far suggested. Appropriate tests for its determination would make it as definite a criterion too as any now in use.)

Suggestions as to the Possible Neurility of Euphoria and the Sthenic Index. GEORGE V. N. DEARBORN, Tufts College Medical School.

The basal feeling-tones (euphoria and dysphoria) so far as physiological, are more or less determined by the environment of the receptors, euphoria representing relatively perfect adaptation. Three chief factors seem contributory to the euphoric cenesthesia: (A) nutritional and sympathetic influences from the intestinal villi; (B) kinesthesia proper; and (C) the epicritic (dermal) impulses. The four million villi of the intestine, rich in muscle and sympathetic nerves, probably adapt the blood's content of the nutritive "lipoids" and protein to the immediate needs of the nerve-cells, and beside may send inward sympathetic influences which in the brain become euphoric. The tonus and the active contraction of the voluntary musculature (by way of the articular, muscular, tendinous osseous, and dermal receptive fields) make variable but essential contributions to the dynamic reservoir of the central nervous system. Moreover (Bergson) kinesthesia undoubtedly adds much of euphoric trend to the cenesthesia by providing in part both intensity and extensity to the other senses. The integrated epicritic impulses appear to predominate in human physiologic euphoria, and there seem to be two chief modes of stimulation, *evaporation* and *oxidation*. A list of the more or less influential elements of the human skin would include the complex vaso-motor mechanism, afferent sympathetic dendrites, the peculiarly efficient epidermis, sweat glands, sebaceous glands: Meissner's corpuscles, the terminal menisci, nerve-rings of Bonnet (?), the terminal cylinders of Ruffini, Vater-Pacinian corpuscles, free nerve-endings; heat-, cold-, pain-, pleasure-, and tickle-receptors; and the arrectores pilorum muscles. Air that is dead, *i. e.*, not moving; humid and too warm; humid and too cold; or lacking in oxygen, is a chief occasion of physiologic dysphoria. Physiologically, these conditions probably are *lacks*,—lack of movement over the skin, lack of dryness (evaporation so being lessened), lack of the physiologic temperature, and lack of dermal oxygen,—reflex determinants of respiration. As related to neural dynamics, these lacks may be deemed productive of deficiencies in the cen-

thetic streams which support the cerebral neurokinesis—the absence of normal stimulation from the environment. Adopting for the nervous system the all-or-none principle, the actual neurology (“viatility,” Morat) of the euphoric and sthenic balance becomes an interpretation of the “synaptic” relations in the action-system. Physiologic euphoria is, then, more or less determined by ample, unimpeded, and undeflected neurokinesis flooding the cerebral gray from the kinesthetic receptors and from whichever dermal receptors represent the influence of air of optimum temperature moving over the body, whenever the cerebral neurones are not short of their proper nutriment. This unimpeded flood of ample neurokinesis is a condition of a high sthenic index capable of factuating (or inhibiting) vigorously a rapid succession of motor paths.

The Articulation of the Concepts of Normal and Abnormal Psychology.

JARED S. MOORE, Western Reserve University.

There is a striking difference in terminology and point of view between the literatures of normal and abnormal psychology as we find them today. Especially, the doctrine of the complex, which is so important for abnormal psychology, is disregarded by writers on normal mental processes. This is unfortunate and unreasonable, and detrimental to the student of our science. A complete understanding of mental disorders involves an understanding of the complex as a normal factor in mental life.

The psychological problem is threefold,—structural, genetic, and dynamic. Structurally, the complex is composed of cognitive and affective elements,—the cognitive elements being grouped into ideas, and these into systems of ideas. So, again structurally, personality is an integration of systems of complexes,—the individual complexes being grouped into systems, these into systems of a higher order, etc. The genetic problem is itself twofold,—the problem of the development of complexes out of their elements, and the problem of the development of the personality by the accretion of new complexes. The dynamic problem is concerned with the conative aspect and motor tendencies of the complex, and leads to the distinction between normal and abnormal psychology,—normal psychology treating of the harmonious activity of complexes, abnormal psychology treating of conflict, repression, and dissociation.

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PROCEEDINGS OF THE NINTH ANNUAL MEETING OF
THE SOUTHERN SOCIETY FOR PHILOSOPHY AND
PSYCHOLOGY, ATLANTA, GA.,

REPORT OF THE SECRETARY

The Southern Society for Philosophy and Psychology held its ninth annual meeting at Atlanta, Ga., Wednesday, December 31, 1913, and Thursday, January 1, 1914, in affiliation with the American Association for the Advancement of Science. Fifteen of the 56 members were present. Three sessions were held, one on Wednesday forenoon in conjunction with Section H of the A. A. A. S., one on Thursday forenoon, and one on Thursday afternoon in conjunction with Sections H and L of the A. A. A. S. The meetings were held in the chemical lecture room of the Georgia School of Technology. On Wednesday evening the members of the society and of Sections H and L were entertained at a smoker at the University Club by Dr. H. J. Pearce, the President of the Society. The President's address, entitled *The Limitations of Knowledge*, was given at 4:30 on Thursday afternoon.

The following items were passed upon at the business meeting held Thursday forenoon:

1. The place of holding the next meeting was left to the Council for decision. Professor Ogden invited the Society to come to Knoxville, but as the A. A. A. S. will meet at Philadelphia the suggestion was made that the Society meet one day at Washington and then join some of the sections at Philadelphia.

2. The following officers were elected: President, J. B. Watson, Johns Hopkins University; Vice President, Josiah Morse, University of South Carolina; Secretary-Treasurer, W. C. Ruediger (re-elected), The George Washington University; Council for three years, E. F. Buchner (re-elected), Johns Hopkins University, and L. R. Geissler, University of Georgia; for two years, J. C. Barnes, Maryville College; for one year W. H. Chase, University of North Carolina.

3. The following new members were elected: Dr. Edwina Abbott, Tulane University; Mrs. A. H. Arlitt, Tulane University; Dr. F. M. Barnes, St. Louis; David June Carver, Johns Hopkins University;

Edward Conradi, Florida State College for Women; Dr. Harvey W. Cox, University of Florida; Professor Ezra B. Crooks, Randolph-Macon Woman's College; Miss Lucile Dooley, Knoxville, Tenn.; James Wallace Hopkins, Tulane University; Miss Marguerite Kehr, Knoxville, Tenn.; Professor Mark Edgar Sentelle, Davidson College; Dr. E. K. Strong, Jr., Columbia University.

4. The accounts of the Treasurer, which were audited for the Council by Professor Ogden and approved by the Society, showed a balance on hand, December 31, 1913, of \$82.44. Of this \$15.00 was allowed the Secretary toward defraying his expenses incident to the Atlanta meeting.

5. The Secretary was authorized to frame an amendment to Section 1, Article III, of the Constitution changing the term of office for the Secretary-Treasurer from one year to three years.

The following papers were read by members of the Society either before sessions of the Society alone or before joint sessions with Sections H and L.

New Interpretations of Psychoanalytic Data. TOM A. WILLIAMS, Washington, D. C. *Correlation of Physical and Mental Measurements.* J. C. BARNES, Maryville College. *Dreams as Retrostructive Interpretations.* W. B. SMITH, Tulane University. *The Master Motive in a Theory of Knowledge.* JOHN G. HARRISON, Mercer University. *Rational Psychotherapy.* ROBERT S. CARROLL, Asheville, N. C. *Concluding from Negatives.* W. B. SMITH, Tulane University. *The Correlation of School Abilities of High School Girls.* E. F. BUCHNER, Johns Hopkins University. *Concerning the Psychological Origin of Creation Stories.* (By title.) W. T. SHEPHERD, Waynesburg College. *Experiments with the "Free Association" Method.* R. M. OGDEN, University of Tennessee. *A Test for Adolescents.* ELEANOR D. KELLER, Baltimore, Md. *Avocational Education.* W. C. RUEDIGER, George Washington University.

The following are abstracts of a few of the papers presented.

Psychoanalysis. DR. TOM A. WILLIAMS, Washington, D. C.

Dr. Williams denied the significance of much of the far-fetched symbolism which the followers of Freud have introduced into mental medicine and explained most of the effects of psychoanalysis as the result of a complicated talking-out of the patient's difficulties and worries, a process seen in daily life in the comfort of a confidant. Clarification ensues. Besides, psychoanalysis takes the patient's

mind from the end result of his worry back to the mainsprings of his mental life, a study of his own motives: this is a desirable scientific attitude, which leads to greater nervous stability and more happiness and better conduct than does brooding upon worries. It is science as against false sentiment. A long course of psychoanalysis furthermore powerfully *suggests* to the patient that the performance is curative. This suggestion accounts for some of the recoveries, but these are likely to be as unstable as those of any method of suggestion, whether labelled medical or masqueraded as faith. The insistence upon any line of inquiry leads the mind of the patient toward the end sought, and human suggestibility accounts for the frequency with which those expecting it find sexual disturbances in neurotic patients and attribute the cause of their nervousness to that factor. History tells us that when convulsions and anesthesia were sought for in the days of the hypnotists, they were as prevalent as the sexuality now is among those who look for it.

Dreams as Retrostructive Interpretations. W. B. SMITH, Tulane University.

1. Though long regarded as an unsubduable outlaw, the Dream is a large, undeniable, innegligible part of experience, for which room must be made in psychology, as room was made for the Imaginary unit in Algebra.

2. Freud's contention, that "the Unconscious can naught but wish," is correct only when wish is taken in the most primal sense of Impulse toward Presentation, toward establishing the antithesis of Self and Not-Self.

3. Dreams must be understood as far as possible in terms of this primitive and persistent tendency. Dreams of the normal are quite as important as of the abnormal.

4. A typical dream is analyzed and found to be a practically instantaneous interpretation (by backward construction of psychic elements) of a somatic stimulus. No wish discoverable but the aboriginal impulse to present images.

5. Two other vivid dreams are shown to have been retrostructive interpretations of somatic stimulations, employing easily recognized psychic elements. Many dreams yield to such analysis.

6. A dream of flying is shown to have started from a peripheral stimulation and to have developed into such a retrostruction.

7. Various well-ascertained facts of dream-life become intelligible when the dream is so understood.

8. A young woman's dream shown to have been elaborate retrostructions interpreting organic sensations.

9. Retrostruction may still be manifest, even when no excitant stimulus can be put in evidence. An illustration from a dream of Determinants.

11. Sharply contrasted interpretations of the same stimulus are possible. Illustration.

12. Comparison of psychic activities, dreaming and waking; also of sense-intuition and rational theory. The analogy of the dream to reckless theorizing, and its kinship with hallucination.

Concluding from Negatives. W. B. SMITH, Tulane University.

1. In the 23d Chapter of the 1st Book of the Prior Analytic, Aristotle announces the Rule of the Syllogism, that "from negative premises nothing can be inferred," but strangely does not discuss it, though expatiating on other Rules. Zeller's explanation is inadequate; it seems likely that Aristotle felt sure of the Rule but unable to give satisfactory reasons.

2. Later logicians have hardly improved on the Master. Only De Morgan's attempted proof, adopted by Keynes, seems to call for notice. The reasoning is fallacious. De Morgan's error is exhibited. The premises, No X is Y , No Z is Y yield the conclusion, Some x is z ($=$ Some z is x), where x is not $-X$.

3. De Morgan's fallacy explained: he proceeded by Obversion-Conversion but neglected to proceed also by Conversion-Obversion. Effect of these procedures in loosening logical ties.

4. Various objections are stated and answered. The negative x (of X) is almost as important in Logic as in Algebra.

5. On introducing it systematically, the four forms of proposition A, E, I, O reduce to two E, I : No S is P , Some S is P . For these the commutative law holds as in Algebra, S and P are interchangeable.

6. There results a simplification of the Syllogism. Only three types are valid:

I. No A is B , No C is B ,—whence Some a is c (Some c is a);

II. No A is B , No C is b ,—whence No A is C (No C is A);

III. No A is B , Some C is B ,—whence Some C is a (Some a is C).

7. All the (19) canonical moods are readily reduced to these three.

8. Considerations urged in the controversy wherein Lotze, Sigwart, and Bradley are involved seem foreign to the foregoing.

The Master Motive in a Theory of Knowledge. JOHN G. HARRISON, Mercer University.

Recognizing much value in all the historical theories, the layman feels that an eclectic theory or a master one must be the final one. Philosophy, being on the experience basis, should not shun but cultivate the analysis of experience. Concrete experience has been studied and formulated by rationalistic methods even when empiricism as a conclusion has been reached. Do not pragmatists operate the same way, and leave their views resting on rationalistic assumptions and procedure?

A chapter on the notion of truth defines it as agreement. The agreement must be progressive, agreeable, harmonious. This reduces to a harmony which criticism will show rests on rationalistic determination. The true and useful are identified, and room is made to declare these to be also the beautiful. Press this and there will appear an ideal and perfected universe loved by rationalists but dreaded by all who prize experience.

A leading must be worth while. Criticism will probably show this to mean worth while to man as man, as morally and even religiously conditioned.

Existence in kinds is admitted. Then nominalism holds one name to represent reality. Leading takes us to where some one's idea copied experience. If not allowed to give a rigid dualism, this will turn out to be transcendental. Admitted consistency will reduce to objectivity and necessity. Coercion admitted to be on thought everywhere will prove to be rational or transcendental.

The suspicion may well be entertained that all the historical methods are valuable for data, but that some sort of a rational one may ever prove to be the one actually used for final estimation.

A Test for Adolescents. ELEANOR D. KELLER, Baltimore.

A series of maxim tests for insight, reason and judgment is suggested to take the place of some of the puzzle tests of Binet-Simon. These seem unfit for subjects over twelve. The maxim test is readily evaluated and can be given to the subject in the laboratory or to a class or group of varying ages. It was given in Baltimore to about 2,000 girls and boys in high schools, to a few defectives of thirteen and over, and to a few post-graduate students.

The returns from 1,404 high school girls give median for Class A, 4.1; Class B, 5.4; Class C, 7.4; and Class D, 7.7. A perfect score would be indicated by 14. This shows that high school

freshmen lack greatly in ability to reason, judge, or interpret maxims. It is not until we reach third and fourth high school years that the curve of distribution approaches the normal.

The returns from about 2,000 boys and girls over thirteen, adolescents, show a growth in ability to reason with maturity, the curve rising with age of subjects. This test is offered to test insight, reason, judgment, the more complex mental powers, in place of some usually found unsatisfactory in Binet-Simon tests for adolescents.

Experiments with the "Free Association" Method. LUCILE DOOLEY.
(Reported by R. M. Ogden.)

The object of this investigation is to study the consciousness of reaction, with special reference to the emotional, infantile and other "complexes" which may appear. A preliminary series of 50 word-reactions is the basis of this report. The words were exposed in a card-changer, and the reaction made by hand with a Morse key. Seven observers, five of them inexperienced, participated. The results have no final importance, but present a fairly adequate survey of the individual types of the reagents.

The types of reaction-consciousness were found to correlate closely with the reaction times. The fastest reactions are those of an automatic type of mind. Verbal imagery is conspicuous. Thought-processes are frequent. The reaction-word is usually a *coördinate* of the stimulus-word. The attitude is impersonal and non-emotional.

Longer reaction-time is correlated with a variation in type towards more concrete experience. Visual images predominate as motives for reaction. These usually refer to objects in *subordinate* relationship with the stimulus-word. Personal reference and emotional complexes are frequent, while the reaction-word is but an automatic adjunct of the experience, and is often omitted.

Concerning the Psychology of the Origin of Creation Stories. W. T. SHEPHERD, Waynesburg College.

The paper is a report of a brief psychological study of the origin of typical creation myths. The writer attempts by an analysis of such stories to ascertain the mental forces which impel primitive peoples to the genesis of that class of myths, and the principal factors which are revealed in such myth making.

Several well known Greek creation myths, such as the Homeric, Hesiodic, Orphic are considered; the Babylonian, old Norse, as well as present day stories of the creation of the world, as believed by the New Zealand natives, etc.

In all the above mentioned myths, psychological analysis seems to reveal the same impelling mental forces and similar mental factors. The writer concludes that curiosity and wonder have been the principal impelling forces to such genesis, while primitive imagination, and primitive credulity have been the principal factors, and primitive reason a subordinate factor in the mental process involved.

EDITORIAL ANNOUNCEMENT

In view of the great increase of material offered for publication, the Editors of the REVIEW PUBLICATIONS announce their intention of starting a new magazine to be called the *Journal of Experimental Psychology*, provided sufficient subscriptions and a small guarantee fund can be obtained. It is proposed to place the new JOURNAL under the editorial charge of Professor Watson; it will contain the same number of pages annually as the REVIEW and will probably appear bi-monthly, at a subscription rate of \$3. The PSYCHOLOGICAL REVIEW will follow its traditional policy, covering the field of general, genetic, and applied psychology, and including theoretical contributions, criticisms, discussions, etc. Professor Warren will assume editorial charge of the REVIEW when the new JOURNAL is started. Notices will shortly be sent to subscribers asking for support of the new enterprise.

HOWARD C. WARREN,
JOHN B. WATSON;
JAMES R. ANGELL,
ARTHUR H. PIERCE.

BOOKS RECEIVED DURING JANUARY

- MODIN, B. *What is Man?* Rock Island, Ill.: Augustana Book Concern, 1913. Pp. 335.
- SEASHORE, C. E. *Psychology in Daily Life*. New York, London: Appleton, 1913. Pp. xviii + 226. \$1.50 net.
- GIESE, F. *Das freie literarische Schaffen bei Kindern und Jugendlichen*. Leipzig: Barth, 1914. Pp. xiv + 242. 14 Mk.
- FALKENFELD, H. *Wort und Seele. Eine Untersuchung über die Gesetze in der Dichtung*. Leipzig: Meiner, 1914. M. 3.
- CROCE, B. *The Philosophy of Giambattista Vico* (Trans. by R. G. Collinwood.) New York: Macmillan, 1913. Pp. xii + 315. \$2.60.
- CARUS, P. *Nietzsche and Other Exponents of Individualism*. Chicago: Open Court Pub. Co., 1914. Pp. 150. \$1.25.
- WALTER, J. E. *Nature and Cognition of Space and Time*. West Newton, Pa.: Johnston and Penney, 1914. Pp. 186.

NOTES AND NEWS

ON January 16, Dr. C. E. Ferree, of Bryn Mawr College, read a paper before the Philadelphia section of the Illuminating Engineering Society entitled: A Preliminary Study of the Deficiencies of the Method of Flicker in the Photometry of Lights of Different Color.

EDMUND B. HUEY, PH.D., died in Connell, Washington, on December 30, 1913. Dr. Huey had been in the west for a year trying to regain his health. He had previously been associated with Dr. Adolf Meyer, at the Johns Hopkins Hospital. He was the author of a book on "The Psychology of Reading" and another on "Mentally Defective Children," and was one of the foremost leaders in the more recent study of mentally defective children. He spent a year studying defective children at the State Home for the Feeble-minded at Lincoln, Ill., and had previous to this spent two years with Janet in Paris. He was preparing a book on clinical psychology, but about six months before his death the notes and what manuscript he had prepared, the accumulation of perhaps ten years, were completely destroyed by fire.

